

44 Feet Dipole. Where is the Truth?

By: Arnie Coro, CO2KK, CUBA

After more than half a century working with professional and amateur radio antenna systems... All I can say this is a never ending subject!! The 44 feet long dipole, 22 feet on each leg came out of the work of the prematurely deceased Len Cebik W4RNL... (Figure 1 shows the 44-Foot Dipole Antenna.)

Len was an antenna modelling fanatic and guru at the same time who had the wisdom to share his gifted knowledge with everyone who approached him, like yours truly. When I asked Len about him choosing the 44 and 88 feet dipoles, he answered with both e-mail and printed correspondence.

By spending endless hours with sophisticated antenna modelling programs that are a real challenge to learn how to use because of the steep learning curve, Len found out that for the frequency range of the amateur bands between 7 and 29 megaHertz, the 44 feet dipole, fed with open wire transmission line of between 300 and 400 ohms impedance was an excellent compromise, using, of course,



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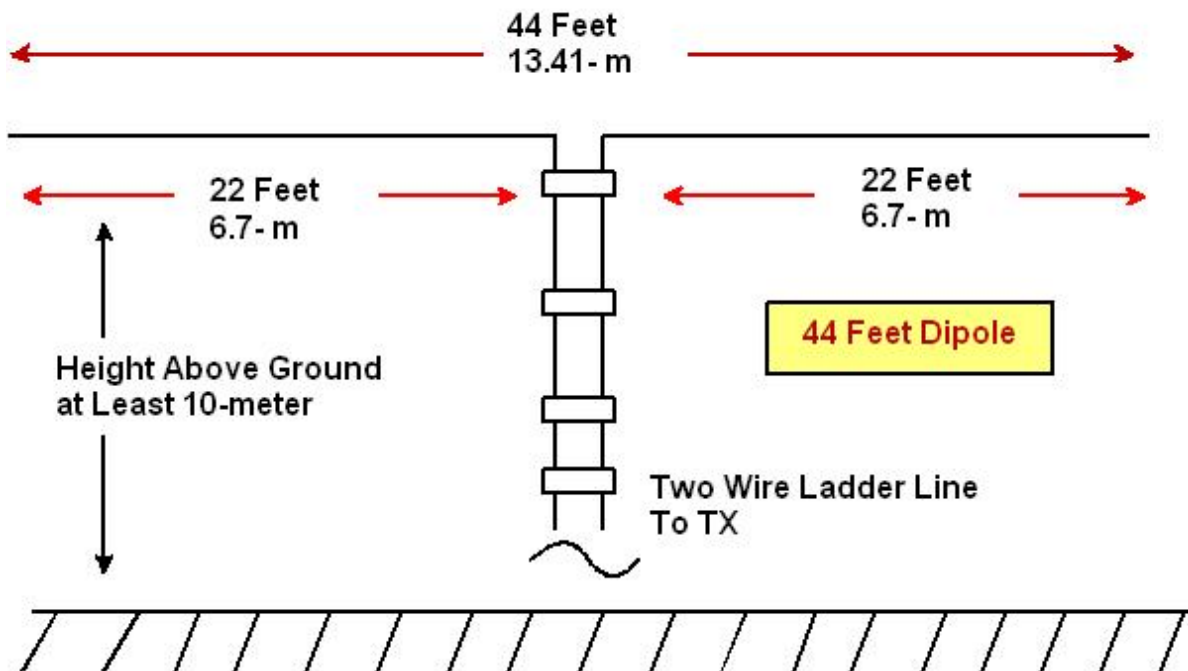


Figure 1
44 Feet Dipole Antenna

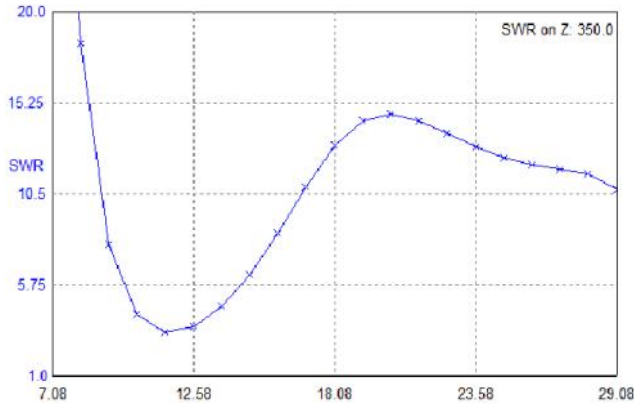
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a well designed and well built antenna tuner plus a good quality SWR meter. 44 feet, when converted to meters will give you a length of 13.41 meters overall, or 6.70 meters for each leg. Likewise, the 88 feet overall length is 26.82 meters of 13.41 meters on each leg...

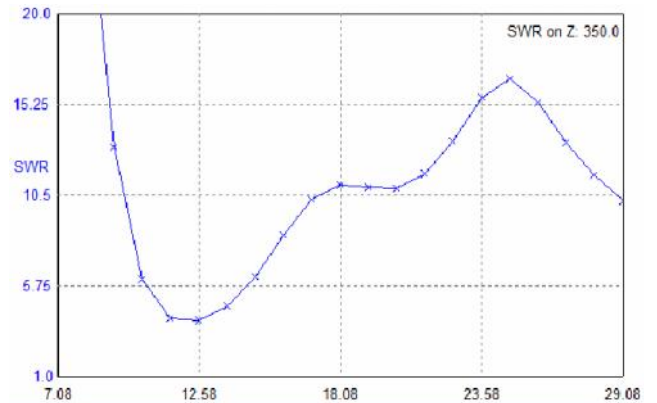
(Figure 2 shows the 88- Feet Dipole Antenna.)

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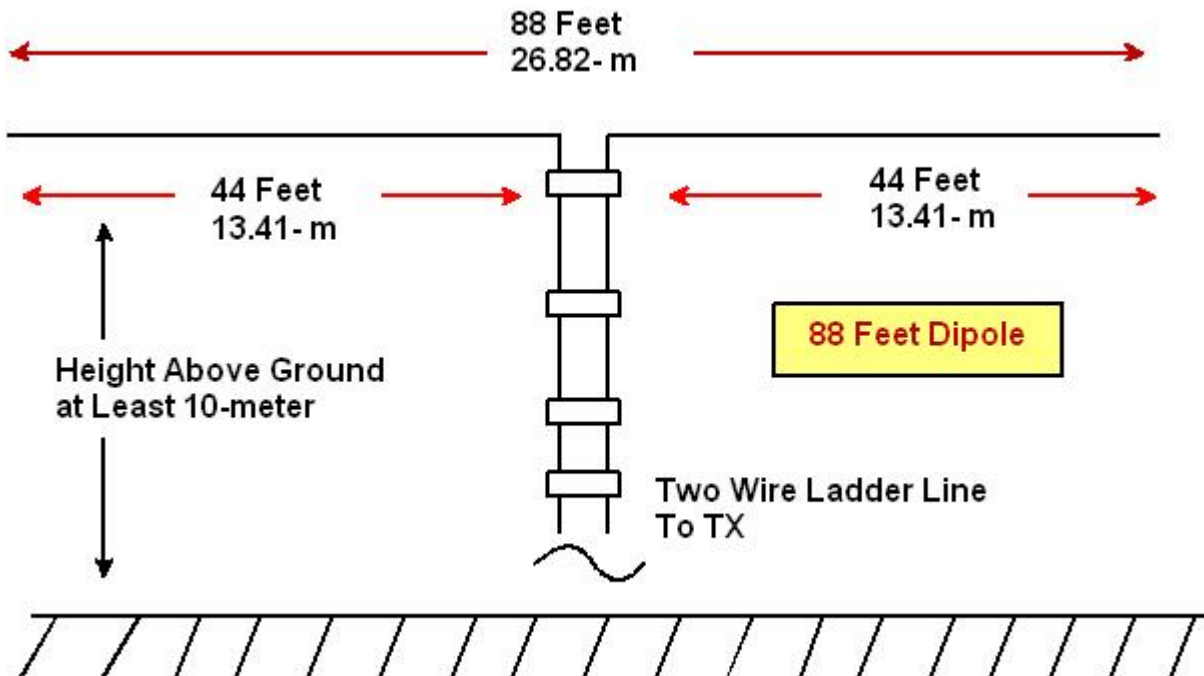
Note I.G.: It is very, very sophisticated and old question – what optimal length for a wave ham antenna is. We may found lots different antennas and lots different way to match the antenna with a feed line. However, let's simulate the input impedance of the antenna with help MMANA. Below you can see SWR (at 350- Ohm Terminal) for 44 feet Antenna placed at 10 and 20-meters above real (simulated by MMANA of course) ground. As you can see the 44- feet antenna really has at the amateur bands SWR/Impedance that could be matched with simple ATU.



SWR (at 360-Ohm Terminal) of a 44-Foot Antenna Placed at 10- meters above Real Ground

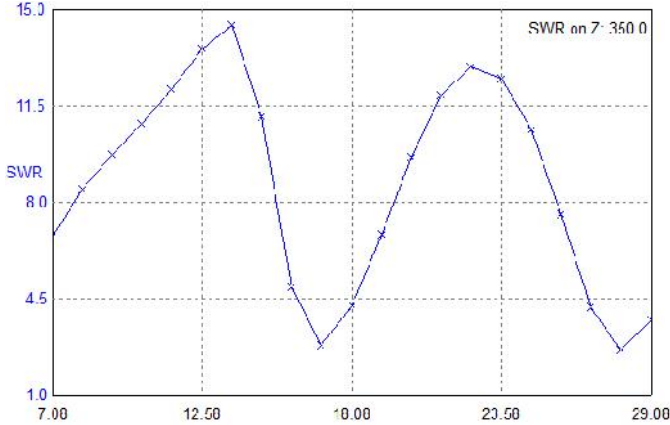


SWR (at 360-Ohm Terminal) of a 44-Foot Antenna Placed at 20- meters above Real Ground



**Figure 2
88- Feet Dipole Antenna**

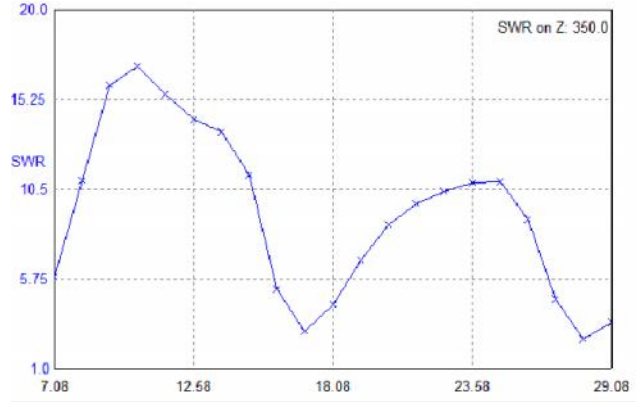
Note I.G.: Below you can see SWR (at 350- Ohm Terminal) for 88- Feet Dipole Antenna placed at 10 and 20- meters above real (simulated by MMANA) ground. As you can see the 88- feet antenna really has at the amateur bands SWR/Impedance that could be matched with simple ATU.



SWR (at 360-Ohm Terminal) of a 88-Feet Antenna Placed at 10- meters above Real Ground

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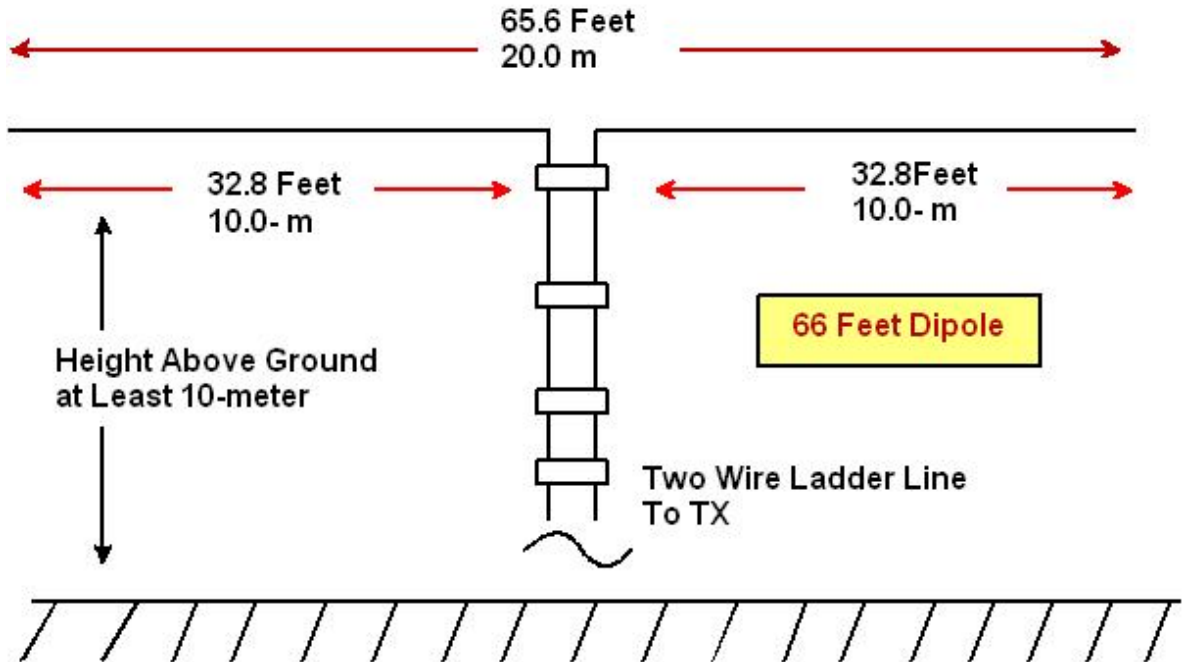
As you can see, the 88- Feet Dipole Antenna is much better matched with 350- Ohm feed line in compare to 44-Feet Dipole Antenna. It is only proved the old amateur's wisdom on antenna- the bigger the better. On my look the 88-Feet Antenna is more preferable, but room for this one!



SWR (at 360-Ohm Terminal) of a 88-Feet Antenna Placed at 10- meters above Real Ground

Now , using the standard accepted formula for calculating the "approximate" length of a wire dipole for the HF frequency range from about 5 to 25 megaHertz.... 143 / frequency in megahertz let us play with a little math amigo !!!

143/ 7.15 for the half wave resonance on the 40 meters band will yield exactly 20 meters , so 10 meters on each side or moving to Imperial British Measures 65.6 feet overall or 32.8 feet on each leg. (Figure 3 shows the 66- Feet Dipole Antenna.)

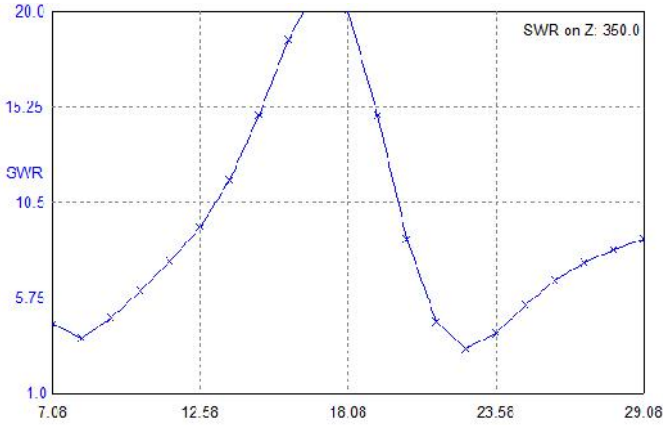


**Figure 3
66- Feet Dipole Antenna**

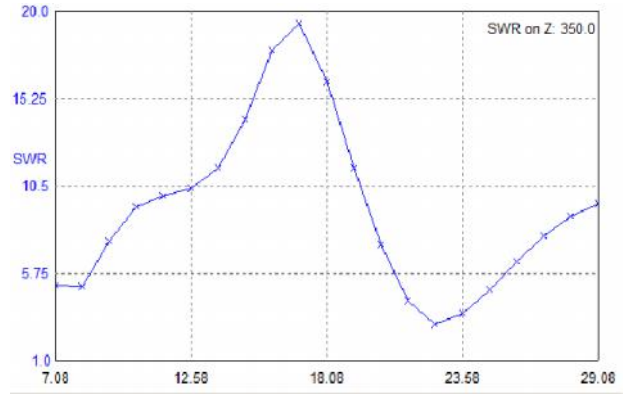
Note I.G.: Below you can see SWR (at 350- Ohm Terminal) for 66- Feet Dipole Antenna placed at 10 and 20- meters above real (simulated by MMANA) ground. As you can see the 66- feet antenna really has at the amateur bands SWR/Impedance that could be matched with simple ATU.

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As you can see, the 66- Feet Dipole Antenna is better matched with 350- Ohm feed line in compare to 44 and 88- -Feet Dipole Antenna. However, if we take in consideration the Gain and Diagram Directivity, the 88- Feet antenna will beat the 66 and 44-Feet Dipole Antenna.



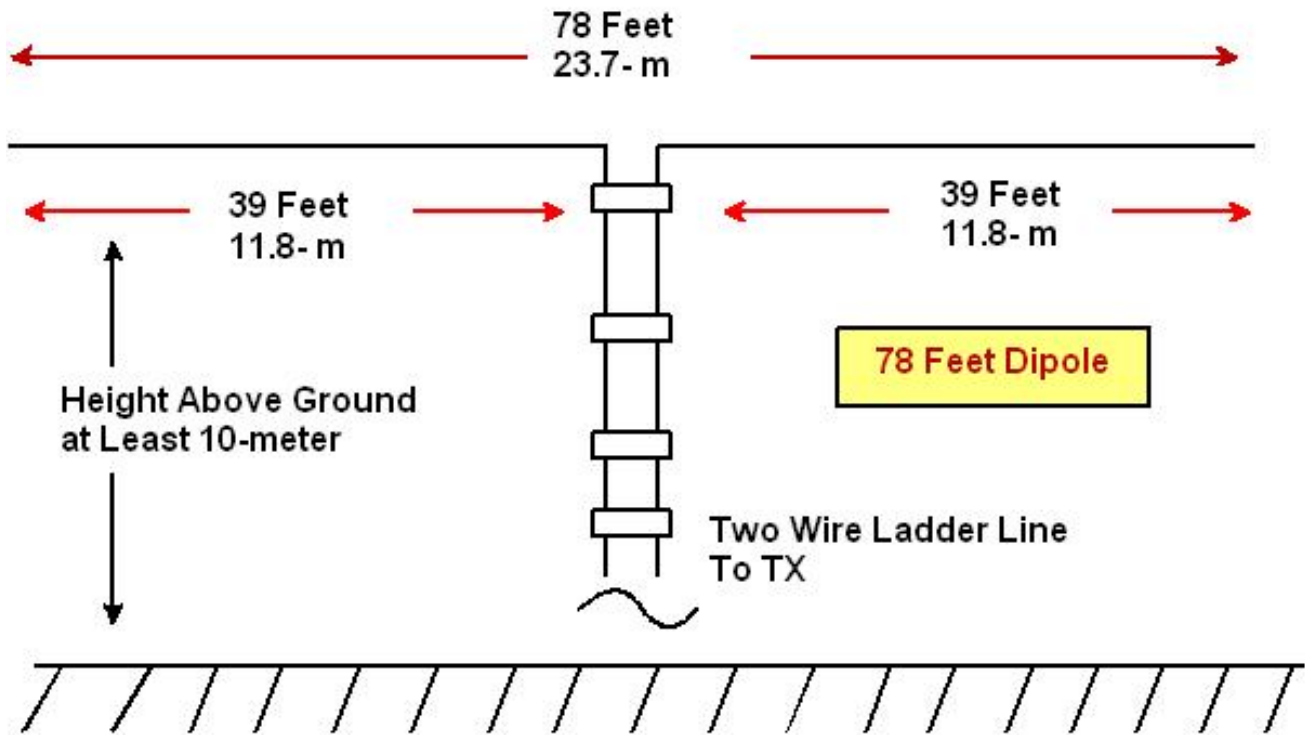
SWR (at 360-Ohm Terminal) 66-Feet Antenna Placed at 10- meters above Real Ground



SWR (at 360-Ohm Terminal) 66-Feet Antenna Placed at 20- meters above Real Ground

So Len Cebik's 44 feet dipole falls short to achieve true half wave resonance on 40 meters of course... But because he recommended to use the open wire transmission line, preferably 400 to 500 ohms

impedance, the open wire line will provide " the missing length" by means of the first few feet of the transmission line



**Figure 4
78- Feet Dipole Antenna**

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After doing my homework with the mathematics, I decided to use a different dipole length for my multiband HF wire antenna... The experimental antenna length that worked best for me was 39 feet long on each leg, or 78 feet overall length, that is 11.8 meters each leg or 23.7 meters overall length.

(**Figure 4** shows the 78- Feet Dipole Antenna.)

In order to make it fit into the available space the last 6 feet of the antenna on each leg are placed at a 90 degrees angle ...

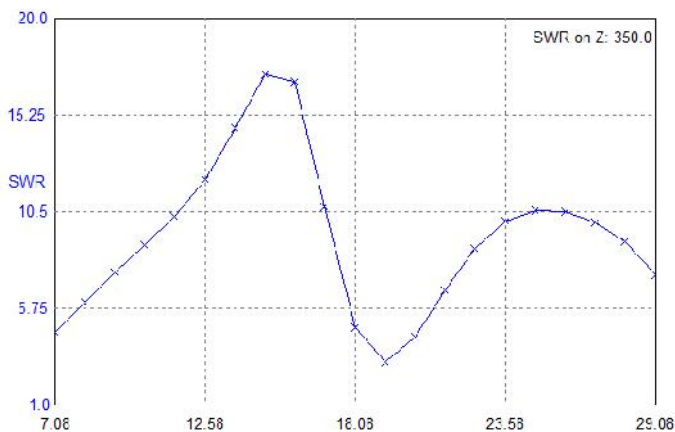
Note I.G.: Below you can see SWR (at 350- Ohm Terminal) for 78- Feet Dipole Antenna placed at 10 and 20- meters above real (simulated by MMANA) ground. As you can see the 78- feet antenna really has at the amateur bands SWR/Impedance that could be matched with ATU.

The antenna is real compromise between 88- 66- and 44- Feet Dipole Antennas. Gain and Diagram Directivity of the antenna is not bad.

Files MMANA for the antennas you may download at

http://www.antentop.org/018/co2kk_018.html

73! va3znw



SWR (at 360-Ohm Terminal) 78- Feet Antenna Placed at 10- meters above Real Ground

44 Feet Dipole. Where is the Truth?

In order to increase the bandwidth of my 78 feet or 23.7 meters dipole fed with open wire line of 400 ohms, I used two wires on each leg, that are spread apart from the center insulator at a distance of 50 centimeters... The open wire transmission line is connected to a junction box, where I can select a 1 to 1 or a 4 to 1 balun that is connected via coaxial cable to the PI network antenna tuner...

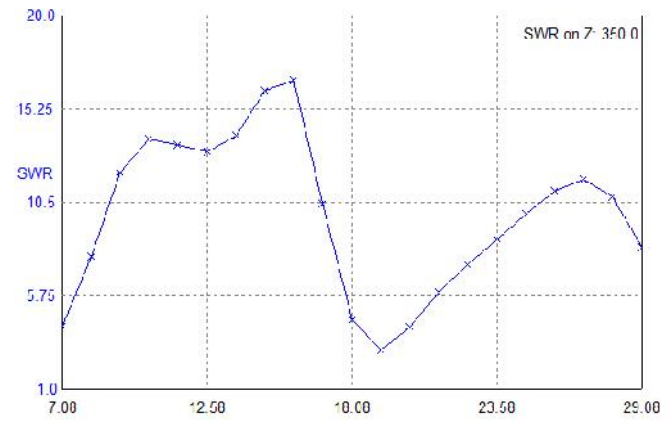
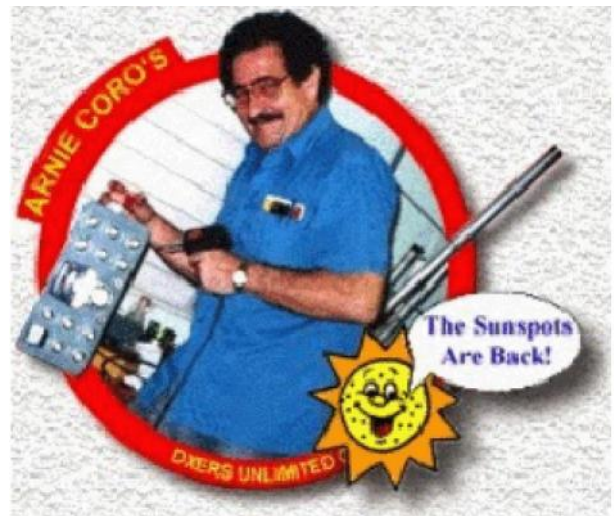
73 and DX

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radio amateur CO2KK

Host of Dxers Unlimited radio hobby program

Radio Havana Cuba



SWR (at 360-Ohm Terminal) 78- Feet Antenna Placed at 20- meters above Real Ground



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